

Low Back vs. Hip Pain: How to Decide?

Experts explain how to distinguish between these frequently overlapping presentations.

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Delineation of lower back from hip pain can be difficult due to the number of potential pain generators in the area of the lower back and hip region that have similar referral patterns. Overlapping pain patterns often lead to misdiagnosis. A thorough history and physical examination of the low back, hip and knee, coupled with appropriate diagnostic testing, can help to provide an accurate diagnosis of the pain generator(s). Pain may be multifactorial in this region, especially in the patient who is aging and has multiple joints that are degenerating. The following review will establish a differential diagnosis as well as a diagnostic approach for confusing pain syndromes presenting in the low back or hip. It is also aimed at prompting further consultation with an experienced nonoperative musculoskeletal specialist or orthopedic surgeon. With practice and a systematic approach, most physicians can become proficient in the diagnosis of more common low back and hip problems.

Differential diagnosis of low back, buttock, hip and groin pain is extensive and includes spinal and pelvic fractures, intervertebral disc herniations and radiculopathy, internal disc derangements, lumbar spondylosis, spondylolisthesis, lumbar spinal stenosis, myofascial pain, sacroiliac joint pain, and zygapophyseal joint dysfunction. Intra and extraarticular hip pathology can cause buttock and groin pain as well as pain into the proximal thigh. Pain into the thigh can also result from knee joint pathology. Visceral pathology also can result in groin and back pain.^{1,2}

A thorough history and physical is the first step in sorting out which structure is responsible for the pain. The quality and

location of the pain, the presence or absence of paresthesias and whether or not the patient has weakness must be investigated. Provocative and alleviating features should be assessed. Any radiographic studies that are ordered must be evaluated in tandem with the history and physical and never in isolation. Pain secondary to intraarticular hip pathology can result in groin and anterior thigh and less commonly into the buttock, lateral and posterior thigh.³ Pain is achy more than sharp and is worse with weight bearing. The patient may complain of a limp.

Causes of intra-articular hip pathology include osteoarthritis and rheumatologic disorders including rheumatoid arthritis, the seronegative arthropathies (including ankylosing spondylitis, Reiter syndrome, inflammatory bowel disease and psoriatic arthritis) as well as systemic lupus erythematosus. Morning stiffness from osteoarthritis often resolves after 15 minutes while stiffness related to rheumatoid arthritis may persist for an hour. A full review of systems must be performed to look for other manifestations of these systemic disorders. Trauma can result in fractures and labral tears. Stress fractures of the femur can present with anterior thigh pain that is worse with weight bearing. Labral tears can result in a feeling of instability, locking or a popping sound.

Infection of the hip may occur in patients who are immunocompromised or have a history of another infectious site. Avascular necrosis may be seen in patients with a history of alcohol abuse, steroid exposure and sickle cell anemia. Childhood disorders include developmental dysplasia, Legg-Calve-Perthes disease, and slipped capital femoral epiphysis. Metabolic etiologies include osteomalacia, gout, pseudogout, Paget's disease and hemochromatosis. Hematologic disorders such as hemophilia

and neurologic sequelae from a Charcot joint can lead to hip joint pathology. Other causes of hip joint pathology include transient bone marrow edema syndrome and femoral acetabular impingement.

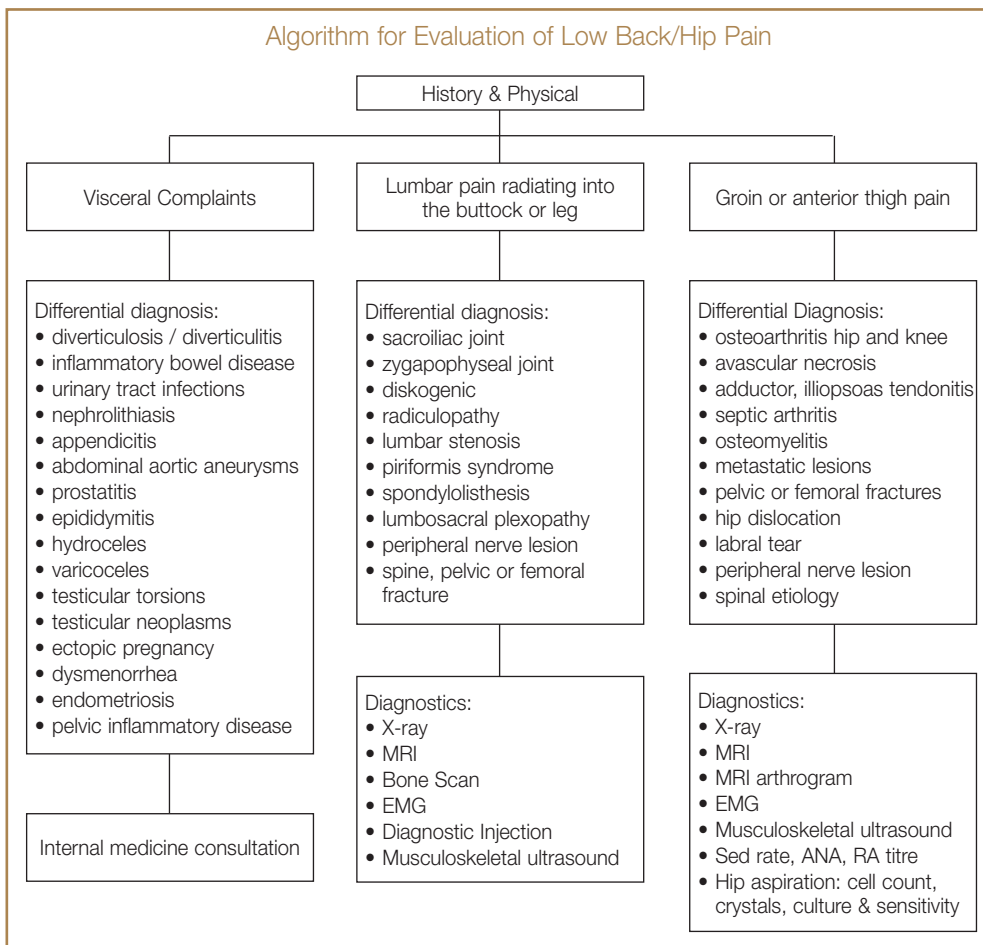
Extra-articular pathology includes bursitis and tendonitis. Medial thigh pain can be a result of hip adductor tendonitis. Anterior thigh pain can occur from iliopsoas tendonitis and bursitis. Lateral thigh pain can result from trochanteric bursitis or a tight tensor fascia lata. Buttock pain may arise from a tender piriformis muscle or the ischial bursa. Radiating pain may be seen with piriformis syndrome secondary to sciatic nerve dysfunction.

Lumbar internal disc derangement, intervertebral disc herniation, spondylolisthesis, sacroiliac joint dysfunction, zygapophyseal joint dysfunction can directly cause pain to radiate from the back into the buttock and groin.⁴⁻⁷ Discogenic pain and sacroiliac pain can radiate further down the leg to below the knee. Discogenic pain is commonly worse with sitting and better with walking. Lumbar stenosis on the other hand generally presents with radiating pain into the extremity with ambulation and is better with sitting.

Pain and/or paresthesias that radiate down the leg may be due to nerve entrapment from a disk herniation causing a radiculopathy. Onset of pain is often rapid and may come after trauma or trunk flexion or can develop spontaneously. Pain and paresthesias into the proximal, middle and distal anterior thigh can result from the L1, L2 and L3 nerve roots respectively. L4 can radiate into the medial shin while L5 radiates to the dorsum of the foot. S1 radiates to the plantar and lateral foot.

Lumbar disc herniations can rarely result in a cauda equina syndrome that can present with lower back pain, saddle anesthesia, motor weakness of the lower

Algorithm for Evaluation of Low Back/Hip Pain



extremities, and bowel and bladder dysfunction. This may start as urinary retention and overflow incontinence. It is one of the few surgical emergencies in spinal medicine; thus, all spinal histories must inquire into bowel and bladder incontinence and/or retention. Red flags possibly indicating spinal malignancy include night pain, pain at rest, intermittent fevers, weight loss, and/or history of prior malignancy.⁸ Any of these should prompt immediate imaging and referral to a specialist.

Visceral lesions must also be considered in the differential. Suprapubic and groin pain may be secondary to abdominal and inguinal hernias. Aortic and femoral artery aneurysms can present with groin pain. Vascular insufficiency can cause radiating pain into the extremity with ambulation. Thus, a full review of systems must be per-

formed. The presence of constitutional symptoms must prompt a work up to rule out serious infection or malignancy. Gastrointestinal disorders such as diverticulosis, diverticulitis, inflammatory bowel disease, appendicitis, and urinary tract infections, nephrolithiasis may also present as hip pain. Groin pain may be the presenting symptom in prostatitis, epididymitis, hydroceles, varicoceles, testicular torsions, and testicular neoplasms in men. Pain in the groin in women may be caused by ectopic pregnancy, dysmenorrhea, endometriosis, or pelvic inflammatory disease.⁹

Vertebral and pelvic compression fractures are a common cause of low back pain, especially in the elderly. Medical history may include long-term steroid use, osteoporosis or malignancy. History of trauma is helpful but not necessary, as many elderly

patients may experience fractures with little or no trauma. Pain can radiate into the groin or extremity if the fracture is into the endplate or projects near the nerve root.

Mononeuropathies can also cause pain into the proximal lower extremity; Lateral femoral cutaneous nerve syndrome can cause pain into the lateral thigh without weakness. Femoral nerve lesions can cause pain into the anterior thigh and obturator lesions can cause radiation into the medial thigh. Ilioinguinal and iliohypogastric lesions can result in groin pain and paresthesias.

Examination of the spine and low back should begin with inspection and palpation of the lumbar spine and pelvis. Skin should be inspected initially. Café au lait spots and neurofibromas can be seen in neurofibromatosis. A papulovesicular rash in a dermatomal pattern may be seen with shingles (Herpes zoster). Pain may

precede the rash. Inspect the lumbar curvature in the lateral and anterior-posterior planes. There are six ranges of motions in the back. They are flexion, extension, bilateral sidebending to approximately 30°, and bilateral rotation to approximately 45°. This may be performed actively by the patient or passively by the physician. Palpation of the spinous processes of the lumbar spine may reveal tenderness and a step off in patients with spondylolisthesis. The pattern of the pain and the movement that provokes the pain should be noted to help establish the diagnosis as well as the therapeutic exercise program if therapeutic intervention is indicated.

Look for pelvic asymmetry while the patient is standing. Observe the gait pattern. Patients with an antalgic gait may have an abnormality in the hip, knee, ankle



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or foot. Patients with hip joint pathology or gluteus medius weakness frequently have a compensated Trendelenberg gait. This occurs when there is a listing of the trunk over the affected side during weight bearing. Weakness of the gluteus medius can also lead to an uncompensated Trendelenberg gait in which the pelvis dips on the side contralateral to the weak side with ipsilateral weight bearing.¹⁰

Place the patient in a supine position. Palpate the anterior hip capsule just beneath the inguinal ligament to look for tenderness over the iliopsoas tendon. If the area over the iliopsoas tendon is painful, then resistance should be performed to hip flexion to see if pain is reproduced. Feel for lymphadenopathy, femoral or inguinal hernia and look for an abdominal hernia if there are complaints of suprapubic pain. Palpate the femoral as well as the popliteal and dorsalis pedis pulses. Look for a leg length discrepancy by measuring the distance from the umbilicus and anterior superior iliac spine to the medial malleoli to look for leg length discrepancy or asymmetry because of scoliosis. Limited and painful motion of the hip joint that reproduces groin, thigh and buttock pain is suspicious for intraarticular pathology. Normal hip range of motion is external rotation 45°, internal rotation 45°, hip flexion 110-130°, extension should be symmetric.

Limited internal rotation of the hip is one of the more sensitive signs of hip pathology. Painful clicking noise with hip motion may correlate with a labral tear but sounds are nonspecific. Hip adductor tendonitis may be diagnosed by finding tenderness over the adductor tendon and reproducing the pain with active adduction and passive stretch of the hip adductors. Tenderness over the pubic symphysis may be seen with os pubitis. Tenderness over the trochanteric bursa is frequently seen with trochanteric bursitis. In this scenario, resistance to active hip abduction may reproduce the pain.

The Thomas flexion test looks for a hip

flexion contracture. The patient is in a supine position and one of the hips is flexed. If the contralateral hip flexes then there is a hip flexion contracture. Ober's test is performed with the patient in a lateral recumbent position. The hip closest to the table is flexed to eliminate the lumbar lordosis. The other hip is abducted and extended so that the thigh aligns with the body. If the iliotibial band is tight then the hip will maintain an abducted position. Pain may be reproduced if the tight iliotibial band is contributing to the pain syndrome. This should be performed bilaterally to look for asymmetry.

The straight leg test should provoke pain between 30 and 70 degrees of hip flexion with lumbar radiculopathy of L4, L5 and S1. The patient is supine with one leg relaxed and the opposite hip is flexed with the knee extended. If pain is reproduced, the leg is dropped a bit and the foot is dorsiflexed to see if the pain is again reproduced. The pain response points more firmly toward radiculopathy if there is radiation below the knee. Pain that radiates to the knee can occur secondary to hamstring tightness as well.¹¹

Reverse straight leg test (femoral nerve stretch test) involves placement of the patient in a prone position while the knee is flexed; if the patient does not have pain then the hip can be extended. With upper lumbar pathology or a femoral nerve lesion the pain radiates into the anterior thigh. Pain can also be seen in this maneuver in patients with femoral neuropathy, a tight iliopsoas muscle or hip joint pathology. It should be performed gently.¹¹

The Gaenslen test is used to evaluate SI joint pathology. The patient is supine, grasping one knee and bringing the thigh to the chest. The opposite leg is in hip and knee extension and then pressed downward further into extension. Pain in the area of the SI joint is positive. The specificity of this test is questionable.¹¹

A thorough motor and sensory examination must be performed to help establish therapeutic direction as well as to make a

diagnosis. Hip flexors are innervated by the femoral nerve (L2-L4), the hip adductors by the obturator nerve (L2-L4), and the hip abductors by the superior gluteal nerve (L4-S1). The quadriceps are innervated by the femoral nerve, roots (L2-L4) and the ankle dorsiflexors and the great toe extensors are innervated by the peroneal nerve (L4-S1). Ankle plantar flexors are innervated by the tibial nerve (L5-S2). Also, examine for symmetric reflexes. An abnormal patellar reflex can be from L2, L3 or L4 root involvement. Abnormal Achilles reflex may indicate S1 root pathology.

Sensory abnormalities should follow a specific dermatomal and peripheral nerve distribution and correlate with other exam findings. L1, L2 and L3 nerve roots innervate the anterior, proximal, middle and distal thigh. L4 dermatome can be evaluated by checking pin prick just proximal to the medial malleolus, L5 on the dorsum of the foot and S1 inferior to the lateral malleolus. The lateral femoral cutaneous nerve distribution should be checked on the lateral thigh, femoral nerve on the anterior thigh and saphenous nerve along the medial shin. Proprioception at the ankle and great toe should be checked as well.

Appropriate diagnostic studies can be ordered once a differential diagnosis has been generated based on the history and physical examination. Standard X-rays of the hip are generally the first test to order when fracture or osteoarthritis of the hip is a consideration. Pelvic X-rays are a consideration if a pelvic fracture is a consideration. X-rays of the hip with osteoarthritis may show a narrow joint space, sclerosis of the joint line, osteophyte formation and subchondral cysts. The presence of osteoarthritis without an appropriate history or physical does not mean that the patient is symptomatic from osteoarthritis. On the other hand, there may be arthroscopic evidence of arthritis in 32 percent of patients with normal hip radiographs.¹² Furthermore, detection of a neoplastic lesion based solely on radiography requires at least 50 percent of tissue erosion.

Avascular necrosis may present with a subcortical lucent sign or more advanced areas of sclerosis and femoral head collapse. Bone scan and MRI are more sensitive ways to find fractures or avascular necrosis which is not apparent on plain xray. CT scan may be used to look for fractures if MRI can't be performed on a patient with a metallic implant or a pacemaker. Bone scan can be useful in patients with widespread pain when bone metastasis is suspected. MRI with intraarticular gadolinium is used to look for labral tears. Ultrasound is an excellent modality to look at soft tissue in the area. Muscular tears, tendonitis, and bursitis can be seen with the use of ultrasound.

MRI of the pelvis and spine can be utilized to work up the spine as a potential pain generator. However, as per the hip, radiographic studies do not show pain. Discogenic changes are frequently seen on patients who are asymptomatic.¹⁵ Electrodiagnostic studies can be used to look for objective evidence of lower motor neuron lesions. Lumbar discography can be used to prove that a given disc or discs are painful. In these authors' opinion, the discogram should be a preprocedural study and if a procedure is not being contemplated, the study should not be performed. Furthermore, even with discography, false positive and false negative responses can occur.¹⁴

Diagnostic injection is the "gold standard" for diagnosis of the painful sacroiliac joint and zygapophyseal joint pain.^{15,16} At least two blocks are performed and there must be at least 75 percent relief of pain. There is a false positive rate of 38 percent for one zygapophyseal joint injection.¹⁷ History and physical exam can't be used to reliably diagnose sacroiliac joint or facet joint pain.¹⁵ Selective nerve root blocks can be used to help to evaluate if radiculopathy is responsible for radiating pain into and extremity. North et al compared nerve root block, sciatic nerve block, medial branch posterior primary ramus block and a subcutaneous control injection in patients with sciatica. They concluded that positive

uncontrolled local anesthetic blocks were non-specific but that negative blocks may have some predictive value.¹⁸ Derby et al looked at the predictive value of a selective steroid nerve root injection at one week following the procedure. Relief of leg pain was predictive of a positive surgical outcome in patients who had pain for more than one year while patients who did not get relief of leg pain had much less success with surgical intervention.¹⁹

Fluoroscopically guided hip injections with lidocaine can be used to delineate hip joint from spine pathology and prognosticate on the outcome of hip arthroplasty.^{20,21} One must not forget that a selective nerve root block of L2, L3 and L4 may blunt afferent information from the hip and falsely point toward a nerve root as the source of the pain when the hip may be responsible.

Lab studies may be indicated. Rheumatologic screen may include sed rate, c-reactive protein, ANA and HLA B27. Suspicion of a rheumatologic disorder may also lead to referral to a rheumatologist for a more sophisticated evaluation. Sed rate and C-reactive protein may be elevated with avascular necrosis, and abnormal renal and liver function studies may be predisposing factors. Hip aspiration may be performed to obtain synovial fluid. Screen for infection includes cell count and culture and sensitivity for bacterial and fungal infections. Joint crystals may be seen in patients with gout or pseudogout.

Conclusion

A thorough history and physical is critical in deciding which studies should be ordered and interpreting the clinical significance of any studies that are ordered for the patient. Referral to a musculoskeletal specialist such as an orthopedic surgeon, physiatrist or rheumatologist is indicated with pain into the groin and limited or painful hip range of motion. More urgent referral is warranted in the case of patients who are febrile or have a history of trauma, or when there is a suspicion of fracture or

malignancy. Patients with acute onset of lower extremity weakness or bowel or bladder dysfunction may require immediate referral to an orthopedic or neurosurgical service if a cauda equine syndrome is suspected. **PN**

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